

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Hean Koo on 01/16/10. Applicant amends the specification as follows.

On the specification:

Please Replace Paragraph that begins on page 8, line 25 of the specification with the following:

One or more buttons 26 can also be provided on the housing of the computer 10 to be used in conjunction with the touchpad 16. The user's hands have easy access to the buttons, each of which may be pressed by the user to provide a distinct input signal to the host computer 12. Typically, each button 26 corresponds to a similar button found on a mouse input device, so that a left button can be used to select a graphical object (click or double click), a right button can bring up a context menu, etc. In some embodiments, one or more of the buttons 26 can be provided with tactile feedback as described in copending patent applications 09/156,802, entitled "Haptic feedback Control Devices," filed September 17, 1998, now U.S. Patent No. 6,184,868 and [09/_____,] 09/467,309 entitled, "Haptic Feedback for Directional Control Pads," filed Dec. 17, 1999, now U.S. Patent No. 6,563,487, and both incorporated herein by reference. Other features of these disclosures may also be used with the present invention.

Art Unit: 2629

Please Replace Paragraph that begins on page 13, line 6 of the specification with the following:

In some embodiments, the user is able to push the touchpad 16 along the z-axis to provide additional input to the computer 10. For example, a sensor can be used to detect the position of the touchpad 16 along the z-axis, such as an optical sensor, magnetic sensor, Polhemus sensor, etc. The position on the z-axis can be used to provide proportional input to the computer, for example. In addition, other types of forces can be output along the z-axis, such as spring forces, damping forces, inertial forces, and other position-based forces, as disclosed in copending patent application no. [09/_____] 09/467,309 entitled, "Haptic Feedback for Directional Control Pads." In addition, 3-D elevations can be simulated in the graphical environment by moving the pad to different elevations along the z-axis. If the pad 16 can be used as an analog input depending on the distance the entire pad is moved along the z-axis, and/or if kinesthetic (force) feedback is applied in the z-axis degree of freedom, then a greater range of motion for the pad 16 along the z-axis is desirable. An elastomeric layer can be provided if the touchpad 16 is able to be pressed by the user to close a switch and provide button or switch input to the computer 10 (e.g. using contact switches, optical switches, or the like). If such z-axis movement of the pad 16 is allowed, it is preferred that the z-axis movement require a relatively large amount of force to move the pad at least initially, since such z-axis movement may not be desired during normal use of the pad by the user.

Please Replace Paragraph that begins on page 14, line 1 of the specification with the following:

Art Unit: 2629

The touchpad 16 can also be integrated with an elastomeric layer and/or a printed circuit board in a sub-assembly, where one or more actuators are coupled to the printed circuit board to provide tactile sensations to the touchpad 16. Helical springs can also be provided to engage electrical contacts. Or, multiple voice coil actuators can be positioned at different locations under the touchpad 16. These embodiments are described in copending application [09/_____] 09/467,309, entitled, "Haptic Feedback for Directional Control Pads." Any of the actuators described in that copending application can also be used in the present invention.

Please Replace Paragraph that begins on page 14, line 26 of the specification with the following:

In different embodiments, other types of actuators can be used. For example, a linear voice coil actuator as described for FIG. 5 can be used, in which an inertial mass is coupled to the linear-moving portion of the voice coil actuator. Other actuators can also be used, such as solenoids, pager motors, moving magnet actuators, E-core actuators, etc. Many actuators used for inertial haptic sensations are described in copending application [09/_____,] 09/456,887 entitled, "Tactile Mouse Device," filed Dec. 7, 1999, now US Patent No. 6,211,861, and which is incorporated herein by reference. Furthermore, a rotary actuator can be used, where the rotary output force is converted to a linear force approximately along the z-axis. For example, the rotary force can be converted using a flexure, as described in provisional application no. [60/_____,] 60/172,953, entitled, "Haptic Interface Device Providing Linear Tactile Sensations Using a Rotary Actuator," filed Dec. 21, 1999 and incorporated herein by reference.

Please Replace Paragraph that begins on page 19, line 1 of the specification with the following:

Art Unit: 2629

The above haptic sensations can be similar to those described in copending patent application Ser. No. 09/253,132, entitled "Low Cost Force Feedback Pointing Device," filed February 18, 1999, now U.S. Patent No. 6,243,078, and Application No. [09/_____,] 09/456,887 entitled, "Tactile Mouse Device," filed Dec. 7, 1999, now US Patent No. 6,211,861, which are both incorporated herein by reference. Other control devices or grips that can include a touchpad 16 of the present invention in its housing include a gamepad, mouse or trackball device for manipulating a cursor or other graphical objects in a computer-generated environment; or a pressure sphere or the like. For example, the touchpad 16 can be provided on the housing of a computer mouse to provide additional input to the host computer. Furthermore, selective disturbance filtering of forces, as described in copending patent application Ser. No. 08/839,249, and shaping of force signals to drive the touchpad with impulse waves as described in U.S. Pat. No. 5,959,613, can be used with the present invention, both disclosures incorporated herein by reference. Such impulses are also effective when driven with stored power in a battery on the computer 10 or from a bus such as USB connected to a host computer.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABBAS I. ABDULSELAM whose telephone number is (571)272-7685. The examiner can normally be reached on Monday through Friday from 9:00AM to 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amare Mengistu, can be reached on 571-272-7674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

Art Unit: 2629

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Abbas I Abdulsalam/

Primary Examiner, Art Unit 2629

January,16, 2010